



DEPARTMENT OF THE NAVY
COMMANDER
HELICOPTER TACTICAL WING
U.S. PACIFIC FLEET
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SAN DIEGO, CALIFORNIA 92135-7096

COMHELTACWINGPACINST 4790.9B
N4
29 Aug 02

COMHELTACWINGPAC INSTRUCTION 4790.9B

Subj: AVIATION GAS FREE ENGINEERING PROGRAM

Ref: (a) NAVAIR 01-1A-35
(b) OPNAVINST 4790.2H
(c) OPNAVINST 5100.23F

Encl: (1) Sample Letter of Certification and Designation as
an Aviation Gas Free Engineer (AVGFE)
(2) Aviation Gas Free Engineering Training Syllabus/
Recommendation Form (Part I and II)
(3) Fuel Cell Emergency Evacuation/Rescue Plan
(4) Fuel Cell Maintenance Checklist
(5) Aviation Gas Free Engineer Program Manager
Recommendation/Designation
(6) Final Qualification as Fuel Systems Entry Supervisor
(7) Final Qualification as Fuel Cell Safety Observer/
Back-Up Safety Observer
(8) Final Qualification as Fuel Cell Authorized Entrant
(9) Fuel System Repair Area Safety Checklist/Brief

1. Purpose. To provide guidance for maintaining a safe and efficient Aviation Gas Free Engineering (AVGFE) Program for HELTACWINGPAC activities in accordance with references (a) through (c).

2. Cancellation. COMHELTACWINGPACINST 4790.9A.

3. Revision. Due to extensive revision, a complete review of this instruction is required.

4. Background. The hazardous conditions associated with fuel cell maintenance require sound basic knowledge and good judgement on the part of those involved. Reference (a) specifies AVGFE Program requirements with regard to training, inspection, maintenance and repair of aircraft and auxiliary equipment fuel systems at the organizational and intermediate levels. Under this program, a Quality Assurance Representative/Collateral Duty Quality Assurance Representative (QAR/CDQAR) designated as an AVGFE has the responsibility for ensuring that a fuel system is safe from risk of fire, explosion, toxicity or oxygen deficiency or enrichment.

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5. Responsibilities

a. Commanding Officer:

Designate, in writing, a qualified QAR/CDQAR as AVGFE in accordance with reference (b) utilizing enclosure (1). The designation letter will be valid for one year. Commanding Officer's may not delegate certification authority.

b. Unit Maintenance Control will:

(1) Ensure Aircraft Discrepancy Books are annotated "Open Fuel Cell Tank" and "No Electrical/Battery Power."

(2) Ensure no other maintenance is performed on aircraft during purging, depuddling or inerting operations.

(3) Ensure the aircraft external power receptacles and the fuel control panel are tagged "Do Not Apply External/Battery Power to Aircraft - Open Fuel Cell."

(4) Ensure fuel cell maintenance is performed in an area approved by the Maintenance Officer, Fire Marshall and Safety Officer.

c. Unit Quality Assurance/Analysis Division will:

(1) Assign a Program Manager to manage the AVGFE Program.

(2) Ensure all pertinent safety requirements are followed in accordance with references (a) through (c).

(3) Ensure assigned Aviation Gas Free Engineers (AVGFES) are properly trained and designated in writing utilizing enclosures (1) and (2), as applicable.

(4) Ensure required AVGFE support equipment and Personal Protective Equipment (PPE) is available, properly maintained and appropriately calibrated.

(5) Establish a Rescue Plan, to include procedures for emergency rescue and medical treatment (see enclosure (3)).

(6) Ensure Systems Entry Supervisors utilize the Fuel Cell Maintenance Checklist (enclosure (4)) prior to performing fuel cell maintenance.

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(7) Maintain administrative requirements in accordance with references (a) through (c), including a history file of all Gas Free Certificates and related records for a minimum of 12 months, and mishap/accident reports for a minimum of 12 months from the date of issue.

(8) Ensure fuel system Entry Supervisors are properly trained, have the correct equipment and materials required for fuel cell maintenance and follow correct procedures.

(9) Ensure personnel involved in fuel cell maintenance are performing and documenting quarterly training and that Safety Observers are performing and documenting rescue drills every 12 months.

NOTE: Navy personnel shall not certify or issue Gas Free Certificates for contractor operations or personnel per reference (b), paragraph 2-4C.

d. Unit Maintenance Division Officers/CPOs will:

(1) Ensure fuel cell/tank maintenance training and drills are being appropriately conducted and documented.

(2) Ensure training syllabus emphasizes safety first.

(3) Ensure applicable portions of references (a) through (c) are designated as required reading for personnel involved in fuel cell/tank maintenance.

e. Unit Aviation Gas Free Engineering Program Manager will:

(1) Be qualified in accordance with reference (b).

(2) Be designated as the AVGFE Program Manager utilizing enclosure (5).

(3) Perform all duties and responsibilities described in and be thoroughly familiar with references (a) through (c).

(4) Recommend AVGFEs for certification/recertification to the Commanding Officer via enclosure (2), Parts I or II.

(5) Only AVGFE Program Manager may remove records from an AVGFE logbook.

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f. Unit Aviation Gas Free Engineers will:

(1) Certify/recertify annually in accordance with reference (b) utilizing enclosure (2), Parts I or II.

(2) Be designated annually in writing by the Commanding Officer via enclosure (1).

(3) Perform all duties and responsibilities described in and be thoroughly familiar with references (a) through (c).

g. Unit Fuel System Entry Supervisors will:

(1) Complete required training and be qualified as a Fuel System Entry Supervisor via enclosure (6).

(2) Perform all duties and responsibilities described in, and be thoroughly familiar with references (a) through (c).

(3) Ensure that the Fuel Cell Maintenance Checklist (enclosure (4)) is completed and a copy provided to the Quality Assurance/Analysis Division.

(4) Complete required training for Fuel Cell Authorized Safety Observer/Back-up Safety Observer utilizing enclosure (7).

(5) Complete required training for a Fuel Cell Authorized Entrant utilizing enclosure (8).

NOTE: Training on fuel cell maintenance shall only be given by the Entry Supervisor or AVGFE Program Manager.

h. Unit Safety Observer/Back-up Safety Observer will:

(1) Complete required training and be qualified as a Safety Observer/Back-up Safety Observer utilizing enclosure (7).

(2) Perform all duties and responsibilities described in and be thoroughly familiar with references (a) through (c).

(3) Complete required training and be qualified as a Fuel Cell Authorized Entrant in accordance with enclosure (8).

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i. Unit Authorized Entrant will:

(1) Complete required training and be qualified as a Fuel Cell Authorized Entrant in accordance with enclosure (8).

(2) Perform the duties and responsibilities described in and be thoroughly familiar with references (a) through (c).

j. All Units will:

(1) Designate an AVGFE, an AVGFE Program Manager and a Fuel System Entry Supervisor with duties and responsibilities in accordance with references (a) through (c) and this instruction.

(2) Utilize the services of the supporting I-level, ship or station Gas Free Engineer provided demand for AVGFE services is less than three Aviation Gas Free Engineering requirements in a six month period, in accordance with reference (a).

(3) Utilize Fuel System Repair Area Safety Checklist/Brief, enclosure (3) when performing maintenance on fuel cells.


A. J. DZIELSKI

Distribution:
COMHELTACWINGPACINST 5216.1D
List I & II

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LETTER OF CERTIFICATION/DESIGNATION AS AVIATION GAS FREE ENGINEER

From: AVGFE Program Manager
To: Commanding Officer
Via: (1) Quality Assurance Officer
(2) Maintenance Officer

Ref: (a) NA 01-1A-35
(b) OPNAVINST 4790.2H
(c) COMHELTACWINGPACINST 4790.9B

Subj: RECOMMENDATION FOR _____ AS AVIATION GAS FREE
ENGINEER

1. AVIATION GAS FREE PROGRAM MANAGER. Per references (a) through (c), the above named individual has completed the requirements and is recommended as Gas Free Engineer for HH-1/UH-3/H-46/MH-60S (circle one) aircraft.

Signature _____ date _____

2. QUALITY ASSURANCE OFFICER ENDORSEMENT: Recommend approval/
disapproval

Signature _____ date _____

3. MAINTENANCE OFFICER ENDORSEMENT: Recommend approval/ disapproval

Signature _____ date _____

From: Commanding Officer
To: _____

Subj: AVGFE DESIGNATION

1. You are hereby designated as Aviation Gas Free Engineer for the HH-1/UH-3/H-46/MH-60S (circle one) aircraft. Your responsibilities are outlined in references (a) through (c). This designation is active for one year. You must be redesignated in 12 months from the date below.

Commanding Officer

Date

2. ENDORSEMENT: I have read and understand the billet assigned to me.

Signature

Date

AVIATION GAS FREE ENGINEER TRAINING SYLLABUS/RECOMMENDATION FORM
PART I

Name	Rate	SSN
1. <u>Designated as QAR/CDQAR:</u>	Date	Program Manager
2. <u>Formal School:</u>		
a. NAMTG C-600-3000A	Date	Program Manager
3. <u>Required Reading:</u>		
a. NAVAIR 01-1A-35 Chapters 2 & 6	Date	Program Manager
b. OPNAVINST 4790.2H Para 10.2.3 and 14.11	Date	Program Manager
4. <u>OJT:</u>		
a. Document training on each fuel cell with a T/M/S QAR/CDQAR/CDI fuel cell Subject Matter Expert (SME), focusing on any inherent safety consideration. Training shall be signed off by the SME for each fuel cell.		
	Date	SME
(1) Fuel Cell No. 1		
(2) Fuel Cell No. 2		
(3) Fuel Cell No. 3		
(4) Fuel Cell No. 4		

5. Recommendation:

_____ has my recommendation to be
certified as an AVGFE for this command.

Program Manager/Date

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AVIATION GAS FREE ENGINEER TRAINING SYLLABUS/RECOMMENDATION FORM
PART II

1. Annual Recertification Recommendation:

- a. Submit AVGFE Logbook to the AVGFE Program Manager for audit.

Program Manager/Date

- b. Documented completion of one of the following within 12 months of last AVGFE certification letter:

- (1) Issued five AVGFE Certificates
- (2) Pass a practical and oral, or written examination
- (3) NAMTG C-600-3000A course

Program Manager/Date

2. AVGFE Recertification Recommendation:

_____ has my recommendation to be
recertified as an AVGFE for this command.

Program Manager/Date

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FUEL CELL EMERGENCY EVACUATION/RESCUE PLAN

The following general Fuel Cell Emergency Evacuation/Rescue Plan is a guide and should be used in conjunction with any changes or additions the Fuel Systems Entry Supervisor may find appropriate.

1. In the event the Entrant has collapsed or is incapable of exiting the fuel cell, the Safety Observer will alert the Back-Up Safety Observer to summon emergency medical services.

EMERGENCY PHONE NUMBERS: _____**NOTE:**

If TAD, alert Maintenance Control and call the emergency number at _____. If aboard ship, call the Emergency Response Team at _____. Alert Maintenance Control at _____. Treat this situation in the same manner as reporting any emergency onboard the ship. (THIS IS A MEDICAL EMERGENCY). All hands involved in fuel cell maintenance should know these numbers and the location of the nearest phone prior to beginning each fuel system maintenance action.

2. The Back-Up Safety Observer will alert the "rescue control point" (Maintenance Control) as to the nature of the emergency and the location. If the Back-Up Safety Observer is in a building or area located away from Maintenance Control, he/she will use the telephone, portable radio, or any means available to notify Maintenance Control, Medical, and the Fire Department of the emergency in progress.
3. The Safety Observer will remain outside the fuel cell until the Back-up Safety Observer returns to assist. Don safety equipment appropriate to the hazard within the fuel cell.
4. After the Back-up Safety Observer has made emergency notification, he/she will immediately return and assist the Safety Observer in extracting the victim.
5. The primary Safety Observer will enter the fuel cell and extract the incapacitated Entrant.
6. Check incapacitated Entrant for breathing and heartbeat and apply appropriate cardiopulmonary resuscitation measures, continuing until relieved by medical personnel. (This action must be performed by a CPR qualified person).

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FUEL CELL MAINTENANCE CHECKLIST

Ref: (a) NAVAIR 01-1A-35

Entry Supervisor _____ Date _____ Time _____

Aircraft Buno _____ Modex _____

1. Review ADB and brief personnel.
2. Ensure aircraft is positioned in an approved fuel cell maintenance area (at least 100 feet from aircraft radar, operating aircraft engines, auxiliary power units, or any gas turbine engine equipment).
3. Check that the aircraft is chocked and properly grounded.
4. Check that fuel cell maintenance areas are roped off and clearly identified with warning signs reading "DANGER, OPEN FUEL TANK, UNAUTHORIZED PERSONNEL KEEP OUT."
5. Check personnel for proper clothing and equipment, and remove jewelry and spark/flame producing devices prior to entry into the fuel cell maintenance area.
6. Check that all egress and explosive materials are made safe.
7. Check that aircraft batteries are disconnected. Tag aircraft battery connector with warning "DO NOT RECONNECT BATTERY."
8. Check that the aircraft external power receptacles and fuel control panel is tagged. Tag aircraft external power receptacle with warning "DO NOT APPLY EXTERNAL POWER TO AIRCRAFT."

Entry Supervisor Signature

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AVIATION GAS FREE PROGRAM MANAGER RECOMMENDATION/DESIGNATION

From: Quality Assurance Officer
To: Maintenance Officer

Subj: RECOMMENDATION FOR _____ AS AVGFE PROGRAM MANAGER

Ref: (a) NA 01-1A-35
(b) OPNAVINST 4790.2H
(c) COMHELTACWINGPACINST 4790.9B

1. You are hereby designated as an Aviation Gas Free Engineering Program Manager. As such you will:

- a. Establish and administer the AVGFE Program per references (a) and (b).
- b. Monitor the program within the command, ensuring all safety requirements within the scope of this program are followed.
- c. Ensure necessary AVGFE support equipment is available, maintained and calibrated.
- d. Ensure adequate depuddling material is available.
- e. Ensure assigned AVGFE personnel are properly trained and certified/recertified.
- f. Ensure all appropriate personnel are familiar with potential hazards, and establish procedures related to the program.
- g. Provide for the evaluation and testing of fuel cells.
- h. Maintain and perform an annual review of program administrative records and AVGFE personnel logbooks for the purpose of updating local programs to address unexpected problems encountered during the previous year.
- i. Prepare, update, post and ensure all appropriate personnel are familiar with the local Rescue Plan (enclosure (3)).
- j. Recommend AVGFEs for certification/recertification to the Commanding Officer per enclosure (1).

QUALITY ASSURANCE OFFICER/DATE

From: Maintenance Officer
To: _____

Subj: AVGFE PROGRAM MANAGER DESIGNATION

1. You are hereby designated as the command AVGFE Program Manager. Your responsibilities are outlined in references (a) through (c).

MAINTENANCE OFFICER/DATE

2. ENDORSEMENT: I have read the requirements of and understand the billet assigned to me.

SIGNATURE/DATE

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FINAL QUALIFICATION AS FUEL SYSTEMS ENTRY SUPERVISOR

NAME _____ RATE/RANK _____

This page is used as a record of satisfactory completion. Only qualified entry supervisors, AVGFE's or AVGFE Program Managers may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or check out need not cover every item; however, a sufficient number should be covered to demonstrate the individual's knowledge. Selected items may be signed off at appropriate schools during shore based training. In all cases, the responsibility for final qualification rests with the command. This qualification card is a working document and should be kept in the individual's training record/Division Officer's record, to be transferred with the individual.

QUALIFICATION

Having observed satisfactory performance, it is recommended the trainee be designated a qualified Fuel Systems Entry Supervisor.

RECOMMENDED _____ DATE _____
(AVGFE PROGRAM MANAGER)

RECOMMENDED _____ DATE _____
(WORK CENTER SUPERVISOR)

RECOMMENDED _____ DATE _____
(DIVISION OFFICER)

QUALIFIED _____ DATE _____
(QUALITY ASSURANCE OFFICER)

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FUEL SYSTEMS ENTRY SUPERVISOR REQUIRED TRAINING

1. Completion of the following training syllabus is required prior to final qualification for HH-1/UH-3/H-46/MH-60S (circle one) aircraft. The following tasks must be supervised and signed by an AVGFE/AVGFE Program Manager or qualified Entry Supervisor. To be designated as a Fuel Systems Entry Supervisor, you must be:

	Signature	Date
2. Qualifications:		
a. CDQAR/QAR, Detachment or work center supervisor	_____	_____
b. Fuel Cell Safety Observer qualified	_____	_____
c. Fuel Cell Entrant Qualified	_____	_____
d. Respirator Qualified (including physical, training and fit test) Expiration date:_____	_____	_____
e. CPR Certified Expiration date:_____	_____	_____
f. Rescue Drill training Date given:_____ (annual)	_____	_____
3. Training:		
a. Discuss Rescue Plan and Emergency evacuation procedures	_____	_____
b. Discuss the Safety Checklist	_____	_____
c. Discuss defueling, depuddling and purging requirements.	_____	_____
d. Discuss the hazards faced during entry	_____	_____
e. Discuss fuel cell repairs authorized	_____	_____
f. Discuss aircraft specific fuel cell maintenance requirements	_____	_____
g. Discuss qualification requirements for entrant/safety observer	_____	_____

**FINAL QUALIFICATION AS FUEL CELL SAFETY OBSERVER/BACK-UP SAFETY
OBSERVER**

NAME _____ RATE/RANK _____

This page is used as a record of satisfactory completion. Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or check out need not cover every item, however, a sufficient number should be covered to demonstrate the individual's knowledge.

This qualification card is a working document and should be kept in the individual's training record/Division Officer's record, to be transferred with the individual.

QUALIFICATION

Having observed satisfactory performance, it is recommended the trainee be designated a qualified Fuel Cell Safety Observer/Back-Up Safety Observer.

RECOMMENDED _____ DATE _____
(FUEL SYSTEM ENTRY SUPERVISOR)

RECOMMENDED _____ DATE _____
(DIVISION OFFICER)

RECOMMENDED _____ DATE _____
(PROGRAM MANAGER)

QUALIFIED _____ DATE _____
(QUALITY ASSURANCE OFFICER)

SERVICE RECORD ENTRY _____ DATE _____
(PERSONNEL OFFICER)

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FUEL CELL SAFETY OBSERVER/BACK-UP SAFETY OBSERVER TRAINING

1. Completion of the following training syllabus is required prior to final qualification for HH-1/UH-3/H-46/MH-60S (circle one) aircraft. The following tasks must be supervised and signed by an AVGFE/AVGFE Program Manager or qualified Entry Supervisor. To be designated as a Fuel Cell Safety Observer/Back-Up Safety Observer, you must be:

2. Qualifications:

a. Fuel Cell Entrant Qualified _____

b. Respirator Qualified (including physical, training and fit test)
Expiration date: _____

c. CPR Certified

Expiration date: _____

d. Rescue Drill training

Date given: _____ (annual) _____

3. Training:

a. Discuss Rescue Plan and Emergency evacuation procedures _____

b. Discuss the Safety Checklist _____

c. Discuss behavioral effects of fuel exposure in the entrant _____

d. Discuss the hazards faced during entry _____

e. Discuss importance of maintaining visual/verbal communications with entrant during maintenance _____

g. Monitor activities inside and outside of fuel cell to determine entrants' safety _____

h. Identify all requirements to make the aircraft safe for fuel cell maintenance _____

i. Identify authorized clothing required for fuel cell maintenance _____

j. Be familiar with all safety equipment required during fuel cell maintenance _____

k. Know the requirements for repairing assigned aircraft fuel systems _____

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FUEL CELL AUTHORIZED SAFETY OBSERVER/BACK-UP SAFETY OBSERVER REQUIRED READING

REQUIRED READING: All signatures will be given upon satisfactory completion of listed sections. Signatures will be given when trainee demonstrates comprehensive knowledge of subject areas.

- | | TRAINEE/DATE | ENTRY SUP/DATE |
|--|--------------|----------------|
| 1. NA-01-1A-35 | | |
| a. Para. 2-5a, Fuel Cell
Maintenance Personnel Training | _____ | _____ |
| b. Para. 2-5b, Encl (1) Rescue Plan
Mishap Training | _____ | _____ |
| c. Para. 2-5c, Personal Protective
Equipment | _____ | _____ |
| d. Para. 2-6f, Safety Observer | _____ | _____ |
| e. Para. 2-6g, Back-Up
Safety Observer | _____ | _____ |
| f. Para. 2-8a, Categories of
Certification | _____ | _____ |
| g. Para. 2-9, 6-3d, Entry and work
restriction | _____ | _____ |
| h. Para. 2-10, Hazards | _____ | _____ |
| 2. Equipment Operation | | |
| a. Ambient Air Breathing
Pump Operation | _____ | _____ |
| b. Full Face Respirator and Hose
Operation | _____ | _____ |
| 3. Interviews with Fuel Systems Entry Supervisor and AVGFE Program Manager | | |

ENTRY SUPERVISOR _____ DATE _____

AVGFE PROGRAM MANAGER _____ DATE _____

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FINAL QUALIFICATION AS FUEL CELL AUTHORIZED ENTRANT

NAME _____ RATE/RANK _____

This page is used as a record of satisfactory completion. Only qualified entry supervisors or AVGFE Program Managers may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or check out need not cover every item; however, a sufficient number should be covered to demonstrate the individual's knowledge. Selected items may be signed off at appropriate schools during shore based training. In all cases, the responsibility for final qualification rests with the command. This qualification card is a working document and should be kept in the individual's training record/Division Officer's record, to be transferred with the individual.

QUALIFICATION

Having observed satisfactory performance, it is recommended the trainee be designated a qualified Fuel Cell Authorized Entrant.

RECOMMENDED _____ DATE _____
(FUEL SYSTEM ENTRY SUPERVISOR)

RECOMMENDED _____ DATE _____
(WORK CENTER SUPERVISOR)

RECOMMENDED _____ DATE _____
(DIVISION OFFICER)

QUALIFIED _____ DATE _____
(QUALITY ASSURANCE OFFICER)

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FUEL CELL AUTHORIZED ENTRANT REQUIRED READING

REQUIRED READING: All signatures will be given upon satisfactory completion of listed sections. An entry supervisor may give signatures when trainee demonstrates comprehensive knowledge of subject areas.

	TRAINEE/DATE	ENTRY SUP/DATE
1. NA-01-1A-35, Section II		
a. Para. 2-6e, Authorized Entrant	_____	_____
b. Para. 2-8a, Categories of Certification	_____	_____
c. Para. 2-9, Entry and Work Restrictions	_____	_____
d. Para. 2-10, Hazards	_____	_____
e. Para. 2-11, Protective Clothing	_____	_____
f. Para. 2-12, Protective Equipment	_____	_____
g. Para. 2-13, Support Equipment	_____	_____
h. Para. 2-14, Fire Extinguishers	_____	_____
i. Para. 2-15, Aircraft Batteries	_____	_____
j. Para. 2-16, Static Electricity	_____	_____
k. Para. 2-17, Bonding and Grounding	_____	_____
l. Para. 2-18, Generation and Accumulation of Static Electricity	_____	_____
m. Para. 2-19, Susceptibility of Fuels to Electrostatic Ignition	_____	_____
n. Para. 2-5b, Encl (3), Rescue Plan Mishap Training	_____	_____
2. NA-01-1A-35, Section VI		
a. Para. 6-3b, Depuddling	_____	_____
b. Para. 6-3c, Fuel Cell Entry Preparations	_____	_____
c. Para. 6-3d, Fuel Cell Entry	_____	_____
d. Para. 6-3f, Removing Fuel	_____	_____
e. Para. 6-4, Purging	_____	_____
3. Equipment Operation		
a. Ambient Air Breathing Pump Operation	_____	_____
b. Full Face Respirator and Hose Operation	_____	_____

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FUEL CELL AUTHORIZED ENTRANT TRAINING

1. Completion of the following training syllabus is required prior to final qualification for HH-1/UH-3/H-46/MH-60S (circle one) aircraft. The following tasks must be supervised and signed by an AVGFE/AVGFE Program Manager or qualified Entry Supervisor. To be designated a Fuel Cell Entrant, you must be:

2. Qualifications:

- a. Respirator Qualified (including physical, training and fit test)
Expiration date: _____

- b. CPR Certified
Expiration date: _____

- c. Rescue Drill training
Date given: _____ (annual)

3. Training:

- a. Discuss Rescue Plan and Emergency evacuation procedures _____
- b. Discuss the Safety Checklist _____
- c. Discuss behavioral effects of fuel exposure in the entrant _____
- d. Discuss the hazards faced during entry _____
- e. Discuss importance of maintaining visual/verbal communications with safety observer during maintenance _____
- f. Identify all requirements to make the aircraft safe for fuel cell maintenance _____
- g. Identify authorized clothing required for fuel cell maintenance _____
- h. Be familiar with all safety equipment required during fuel cell maintenance _____
- i. Know the requirements for repairing assigned aircraft fuel systems _____
- j. Discuss fuel cell depuddling _____
- k. Demonstrate inspection and proper fitting and testing of Air Supplying Respirator and use of the Rhine Air Machine _____
- l. Know the requirements for repairing assigned aircraft fuel systems _____

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FUEL SYSTEM REPAIR AREA SAFETY CHECKLIST/BRIEF

- | | YES | NO |
|---|-----|-----|
| 1. VIDS/MAF or NALCOMIS MCN reviewed and personnel briefed. | ___ | ___ |
| 2. Maintenance Control VIDs Board flagged. | ___ | ___ |
| 3. During defueling ashore: | | |
| a. Aircraft parked at least 100 feet from any building or smoking area. | ___ | ___ |
| b. Aircraft parked at least 300 feet from ground radar installation. | ___ | ___ |
| c. Aircraft parked 100 feet from operating aircraft engines, ground support equipment auxiliary power units and operating aircraft radar. | ___ | ___ |
| 4. Before fuel cell access panels are removed: | | |
| a. Aircraft chocked and properly grounded. | ___ | ___ |
| b. Aircraft battery disconnected and battery connector tagged with " <u>DO NOT CONNECT ELECTRICAL POWER.</u> " | ___ | ___ |
| c. Aircraft external power receptacle tagged with warning " <u>DO NOT CONNECT ELECTRICAL POWER.</u> " | ___ | ___ |
| d. Aircraft roped off 50 feet in all directions. | ___ | ___ |
| e. Fuel cell maintenance area posted with warning signs " <u>DANGER OPEN FUEL CELL UNAUTHORIZED PERSONNEL KEEP OUT.</u> " | ___ | ___ |
| f. Hazard areas equipped with two 50 pound CO2 fire extinguishers or approved equivalent. | ___ | ___ |
| g. Fuel cell maintenance area clear of non-essential equipment. | ___ | ___ |
| 5. During depuddling: | | |
| a. Personnel shall be equipped with rubber gloves, cellulose sponge or cheesecloth, and utilize explosion-proof wet/dry vac (MIL-V-21987) | ___ | ___ |
| b. All explosion-proof support equipment shall be bonded to aircraft and grounded. Non-explosion proof support equipment located outside fuel cell maintenance area must be grounded. | ___ | ___ |
| 6. During purging: | | |
| a. Blower outlets extended to the outside of the hangar must be and roped off with a 50 foot radius. | ___ | ___ |

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7. Fuel cell testing:

- a. Fuel cell must be tested and certified safe by AVGFE/CSPM. _____
- b. Original copy of confined space entry permit must be posted on main access entry and a copy posted on other access areas. _____

NOTE: Confined space entry permit, issued for entry or work in or around fuel cells shall be valid for a period specified by the AVGFE/CSPM not to exceed eight hours.

8. Before fuel cell entry:

- a. Personnel shall not wear clothing made of materials such as nylon, orlon, dacron, wool or silk. _____
- b. Shoes shall be removed and white cotton socks free of oil, grit and dirt. _____
- c. Personnel shall be equipped with, cotton coverall (MIL-C-14610) _____
- d. Qualified personnel shall be equipped with NAVOSH approved respirator for fuel cell entry. _____

NOTE: The requirement for the use of special safety approved flashlights has been deleted. The ordinary two or three cell flashlights using carbon zinc dry cell have not been found capable of igniting a flammable vapor air mixture under conditions of ordinary usage.

Fuel Cell Maintenance

Entry Supervisor: _____ Date _____

QAR: _____ Date _____

Fuel Cell Entrant: _____ Date _____

Fuel Cell Entrant: _____ Date _____

Safety Observer: _____ Date _____

Backup Safety Observer: _____ Date _____